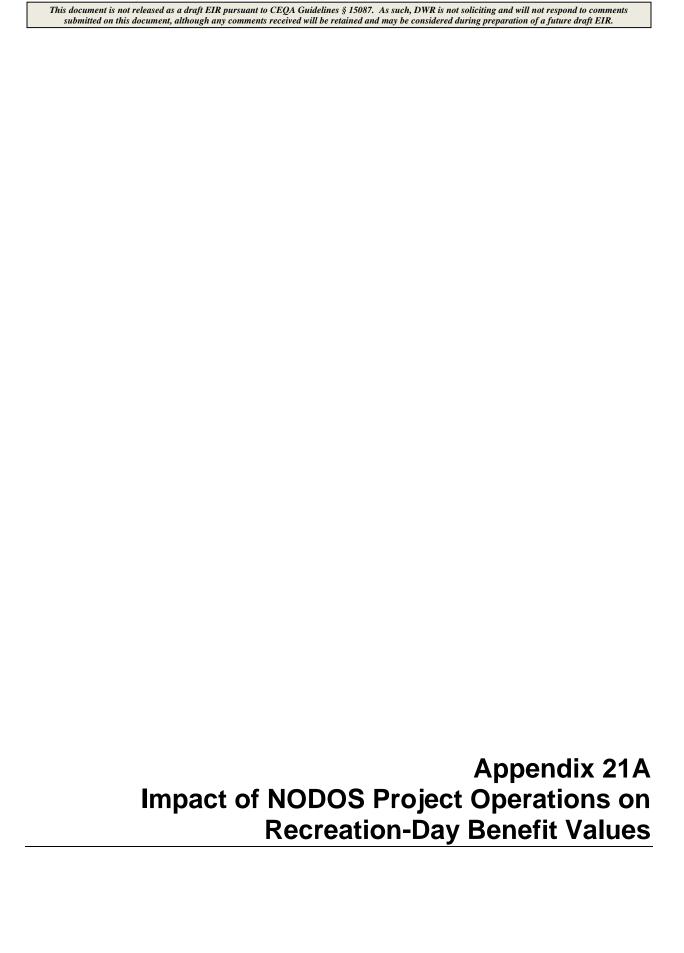


Contents

Appendix 21: Recreation Resources

- 21A Impact of NODOS Project Operations on Recreation-Day Benefit Values
- 21B Impact of NODOS Project Operations on Usability of Reservoir Boat Ramps



IMPACT OF NODOS PROJECT OPERATIONS ON RECREATION-DAY BENEFIT VALUES

Table 21A-1
San Luis Reservoir Recreation-Day Benefit Values^a

San Luis Reservoir Maximum Water Elevation (feet) = MWE Surface Area (acres) =	544 12700	April-Sept Average Surface Area ^b	Surface Area Ratio	Benefit Value Points
Existing Condition		8775	0.691	4.0
NODOS Alternative A		8704	0.685	3.5
NODOS Alternative B		8723	0.687	4.0
NODOS Alternative C		8628	0.679	3.0
No Action Alternative		8742	0.688	4.0

^aReservoir operation portion of the recreation-day benefit value obtained from Project Operations – Reservoir Point Rating Graph from California Department of Parks and Recreation. (California State Parks). 1967 (with Revisions to 1971). Water Project Recreation Planning Manual. Measurement of Benefits, Sections 6400 6411.14.

Table 21A-2
Trinity Lake Recreation-Day Benefit Values with Alternative NODOS Operations^a

Trinity Lake Maximum Water Elevation (feet) = MWE Surface Area (acres) =	2370 16335	April-Sept Average Surface Area ^b	Surface Area Ratio	Benefit Value Points
Existing Condition		12356	0.756	12.0
NODOS Alternative A		12590	0.771	15.0
NODOS Alternative B		12603	0.772	15.0
NODOS Alternative C		12636	0.774	16.0
No Action Alternative		12386	0.758	13.0

^aReservoir operation portion of the recreation-day benefit value obtained from Project Operations – Reservoir Point Rating Graph from California Department of Parks and Recreation. (California State Parks). 1967 (with Revisions to 1971). Water Project Recreation Planning Manual. Measurement of Benefits, Sections 6400 6411.14.

Table 21A-3
Shasta Lake Recreation-Day Benefit Values with Alternative NODOS Operations^a

Shasta Lake Maximum Water Elevation (feet) =	1067	April-Sept Average	Surface Area	Benefit Value
MWE Surface Area (acres) =	29740	Surface Area ^b	Ratio	Points
Existing Condition		24136	0.812	28.0
NODOS Alternative A		24514	0.824	33.0
NODOS Alternative B		24580	0.826	33.0
NODOS Alternative C		24590	0.827	33.0
No Action Alternative		24109	0.811	28.0

^aReservoir operation portion of the recreation-day benefit value obtained from Project Operations – Reservoir Point Rating Graph from California Department of Parks and Recreation. (California State Parks). 1967 (with Revisions to 1971). Water Project Recreation Planning Manual. Measurement of Benefits, Sections 6400 6411.14.

^bAverage end-of-month surface area in acres.

^bAverage end-of-month surface area in acres.

^b Average end-of-month surface area in acres.

Table 21A-4
Lake Oroville Recreation-Day Benefit Values with Alternative NODOS Operations^a

Lake Oroville Maximum Water Elevation (feet) = MWE Surface Area (acres) =	899 15805	April-Sept Average Surface Area ^b	Surface Area Ratio	Benefit Value Points
Existing Condition		12331	0.780	17.5
NODOS Alternative A		12345	0.781	17.5
NODOS Alternative B		12349	0.781	17.5
NODOS Alternative C		12330	0.780	17.5
No Action Alternative		12232	0.774	16.5

^aReservoir operation portion of the recreation-day benefit value obtained from Project Operations – Reservoir Point Rating Graph from California Department of Parks and Recreation. (California State Parks). 1967 (with Revisions to 1971). Water Project Recreation Planning Manual. Measurement of Benefits, Sections 6400 6411.14.

Table 21A-5
Folsom Lake Recreation-Day Benefit Values with Alternative NODOS Operations^a

Folsom Lake		April-Sept	Surface	Benefit
Maximum Water Elevation (feet) =	456	Average	Area	Value
MWE Surface Area (acres) =	11450	Surface Area ^b	Ratio	Points
Existing Condition		9177	0.801	25.0
NODOS Alternative A		9224	0.806	26.5
NODOS Alternative B		9189	0.803	26.0
NODOS Alternative C		9226	0.806	26.5
No Action Alternative		9087	0.794	22.5

^aReservoir operation portion of the recreation-day benefit value obtained from Project Operations – Reservoir Point Rating Graph from California Department of Parks and Recreation. (California State Parks). 1967 (with Revisions to 1971). Water Project Recreation Planning Manual. Measurement of Benefits, Sections 6400 6411.14.

Table 21A-6
Sites Reservoir Recreation-Day Benefit Values with Alternative NODOS Operations^a

Sites Reservoir Maximum Water Elevation (feet) = MWE Surface Area (acres) = Maximum Water Elevation (feet) = MWE Surface Area (acres) =	520 14100 480 12400	April-Sept Average Surface Area ^b	Surface Area Ratio	Benefit Value Points
NODOS Alternative A (480 feet)		10099	0.814	30.0
NODOS Alternative B (520 feet)		11046	0.783	19.0

^aReservoir operation portion of the recreation-day benefit value obtained from Project Operations – Reservoir Point Rating Graph from California Department of Parks and Recreation. (California State Parks). 1967 (with Revisions to 1971). Water Project Recreation Planning Manual. Measurement of Benefits, Sections 6400 6411.14.

^bAverage end-of-month surface area in acres.

^bAverage end-of-month surface area in acres.

^bAverage end-of-month surface area in acres.

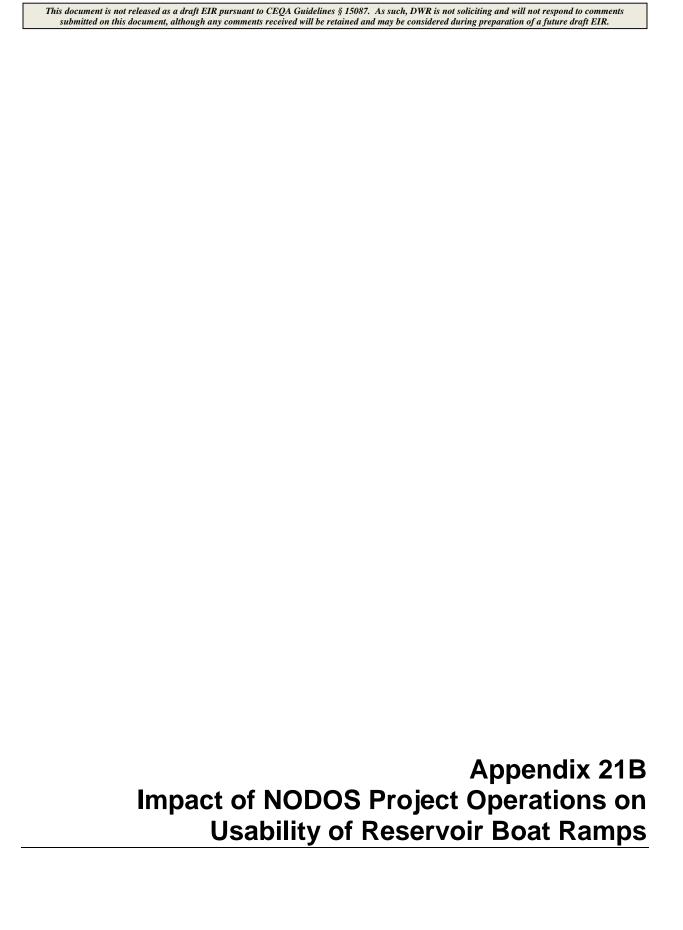
IMPACT OF NODOS PROJECT OPERATIONS ON RECREATION-DAY BENEFIT VALUES

Table 21A-7
Reservoir Recreation-Day Benefit Values (Detailed Results)

[1		1				
	April	May (E	June nd of Mont	July h Surface	August Area)	September	Average	Ratio	Operation Points*
SAN LUIS RESERVOIR					, ,		711 01 4 9 0		
Existing Condition	10866	9788	8246	7886	7698	8166	8775	0.691	4.0
NODOS Alternative A	10956	9813	8219	7717	7449	8071	8704	0.685	3.5
NODOS Alternative A	10930	9845	8212	7717	7449 7447	8134	8723	0.687	4.0
NODOS Alternative C	10905	9745	8095	7610	7387	8025	8628	0.679	3.0
No Action Alternative	10908	9799	8273	7838	7568	8067	8742	0.688	4.0
NODOS Alternative A	10956	9813	8219	7717	7449	8071	8704	0.685	3.5
NODOS Alternative B	10979	9845	8212	7719	7447	8134	8723	0.687	4.0
NODOS Alternative C	10905	9745	8095	7610	7387	8025	8628	0.679	3.0
Maximum Water Elevation	544	feet							
MWE Surface Area	12700	acres							
							L.		
TRINITY LAKE									
Existing Condition	13173	13146	12981	12307	11581	10946	12356	0.756	12.0
NODOS Alternative A	13388	13358	13191	12534	11840	11228	12590	0.771	15.0
NODOS Alternative B	13401	13373	13212	12554	11867	11210	12603	0.771	15.0
NODOS Alternative C	13431	13400	13232	12583	11898	11273	12636	0.774	16.0
NODOS Alternative C	13431	13400	13232	12303	11090	11273	12030	0.774	10.0
No Action Alternative	13219	13188	13021	12336	11594	10955	12386	0.758	13.0
NODOS Alternative A	13388	13358	13191	12534	11840	11228	12590	0.771	15.0
NODOS Alternative B	13401	13373	13212	12554	11867	11210	12603	0.772	15.0
NODOS Alternative C	13431	13400	13232	12583	11898	11273	12636	0.774	16.0
Maximum Water Elevation	2370	feet							
MWE Surface Area	16335								
SHASTA LAKE									
Existing Condition	26976	27080	25618	23211	21445	20484	24136	0.812	28.0
NODOS Alternative A	27181	27375	26021	23641	21899	20968	24514	0.824	33.0
NODOS Alternative B	27231	27460	26105	23731	21957	20996	24580	0.826	33.0
NODOS Alternative C	27252	27447	26117	23732	21962	21031	24590	0.827	33.0
No Action Alternative	26994	07405	05044	23168	21388	20385	24400	0.811	28.0
		27105	25614				24109		
NODOS Alternative A	27181	27375	26021	23641	21899	20968	24514	0.824	33.0
NODOS Alternative B	27231	27460	26105	23731	21957	20996	24580	0.826	33.0
NODOS Alternative C	27252	27447	26117	23732	21962	21031	24590	0.827	33.0
Maximum Water Elevation	1067								
MWE Surface Area	29740	acres							
LAKE OROVILLE									
Existing Condition	13560	14016	13636	11939	10871	9965	12331	0.780	17.5
NODOS Alternative A	13635	14106	13671	11966	10857	9837	12345	0.781	17.5
NODOS Alternative B	13621	14094	13686	12008	10864	9823	12349	0.781	17.5
NODOS Alternative C	13619	14092	13653	11955	10847	9811	12330	0.780	17.5
Alchialive O	10013	17032	10000	11333	10041	5011	12330	0.700	17.5
No Action Alternative	13507	13966	13553	11845	10745	9776	12232	0.774	16.5
NODOS Alternative A	13635	14106	13671	11966	10857	9837	12345	0.781	17.5
NODOS Alternative B	13621	14094	13686	12008	10864	9823	12349	0.781	17.5
NODOS Alternative C	13619	14092	13653	11955	10847	9811	12330	0.780	17.5
Maximum Water Elevation MWE Surface Area	899 15805								
Maximum Water Elevation MWE Surface Area									

FOLSOM LAKE	April 9505	,	June ind of Mont	July h Surface	August	September			Operation
		,	ina or mone		ΔτΔαι		Average	Ratio	Points*
					Aiea)		Average	itatio	1 011113
			40045	0000	0.4.47	7704	0477	0.004	05.0
Existing Condition		10249 10252	10045	9082	8447	7734	9177	0.801	25.0
NODOS Alternative A	9528		10046	9194	8497	7826	9224	0.806	26.5
NODOS Alternative B	9496	10207	10017	9121	8454	7841	9189	0.803	26.0
NODOS Alternative C	9520	10245	10059	9160	8515	7854	9226	0.806	26.5
No Action Alternative	9478	10219	9984	8943	8292	7603	9087	0.794	22.5
NODOS Alternative A	9528	10252	10046	9194	8497	7826	9224	0.806	26.5
NODOS Alternative B	9496	10207	10017	9121	8454	7841	9189	0.803	26.0
NODOS Alternative C	9520	10245	10059	9160	8515	7854	9226	0.806	26.5
Maximum Water Elevation	456	feet							
MWE Surface Area	11450								
		40.00							
SITES RESERVOIR									
Existing Condition	0	0	0	0	0	0	0	0.000	0.0
	10936	10754	10484	9897	9486	9036	10099	0.814	30.0
NODOS Alternative B	11793	11671	11331	10807	10501	10175	11046	0.783	19.0
NODOS Alternative C	12699	12572	12336	11889	11489	11141	12021	0.853	39.5
No Action Alternative	0	0	0	0	0	0	0	0.000	0.0
	10936	10754	10484	9897	9486	9036	10099	0.814	30.0
	11793	11671	11331	10807	10501	10175	11046	0.783	19.0
	12699	12572	12336	11889	11489	11141	12021	0.763	39.5
NODOS Alternative C	12099	12372	12330	11009	11409	11141	12021	0.653	39.5
Maximum Water Elevation	520	feet	Alternative	B and C					
MWE Surface Area	14100								
Maximum Water Elevation	480	foot	Alternative	Δ					
MWE Surface Area	480 feet Alternativ 12400 acres			Λ					

^{*}Operations points for the recreation-day benefit value obtained from Project Operations – Reservoir Point Rating Graph from California Department of Parks and Recreation. (California State Parks). 1967 (with Revisions to 1971). Water Project Recreation Planning Manual. Measurement of Benefits, Sections 6400 6411.14.



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Table 21B-1
Number of Years and Months Boat Ramps at San Luis Reservoir are Not Usable Due to Reservoir Operations

		Exis	ting Condi	itions	No Projec	t/No Actio	n Alternative		Alternative	A	-	Alternative	В		Alternative	С
		Number	Number	Percent	Number	Number	Percent	Number	Number	Percent	Number	Number	Percent	Number	Number	Percent
Boat Ramp	Elevation	of Years	of Months	of Months	of Years	of Months	of Months	of Years	of Months	of Months	of Years	of Months	of Months	of Years	of Months	of Months
Dinosaur Point	378	31	94	19.1%	33	93	18.9%	33	3 89	18.1%	32	90	18.3%	36	5 96	6 19.5%
Basalt Boat Ramp	340	4	7	1.4%	3	4	0.8%	1	I 1	0.2%	3	3	0.6%	1	1 3	0.6%
Total Months Dewatered Percent Decrease in Dewatering Compared to Existing Conditions Percent Decrease in Dewatering Compared to the No			101			97 -14.2%			-20.4%			-17.7%			99 -12.4%	
Project/No Action Alternative									-13.5%	,		-10.6%	1		-4.8%	

Table 21B-2
Number of Years and Months Boat Ramps at Trinity Lake are Not Usable Due to Reservoir Operations

		Exis	ting Condi	itions	No Projec	t / No Acti	on Alternative		Alternative	Α		Alternative	В	Alternative C			
Name of			Number		Number		Percent	Number	Number		Number	Number		Number	Number	Percent	
Boat Ramp	Elevation	of Years	of Months	of Months	of Years	of Months	of Months	of Years	of Months	of Months	of Years	of Months	of Months	of Years	of Months	of Months	
Stuart Fork	2,338	64	303	62%	65	301	61%	64	292	59%	64	l 291	59%	64	291	59%	
Clark Springs	2,324	57	251	51%	56	242	49%	55	237	48%	56	3 235	48%	55	234	48%	
Bowerman	2,323	56	246	50%	56	242	49%	56	3 237	48%	56	3 234	48%	55	233	47%	
Fairview	2,313	52	218	44%	49	207	42%	50	199	40%	50	200	41%	50	195	40%	
Trinity Center	2,300	48	182	37%	45	167	34%	43	157	32%	41	149	30%	44	153	31%	
Cedar Stock	2,230	10	37	8%	11	37	8%	10	31	6%	10	36	7%	10	33	7%	
Minersville	2,170	3	4	0.8%	3	5	1.0%	1	1	0.2%	1	2	0.4%	1	1	0.2%	
Total Months Dewatered Percent Decrease in Dewatering Compared to Existing Conditions Percent Decrease in Dewatering Compared to the No Project / No Action Alternative			1241			-3.2%			-7.0% -3.9%			-7.6% -4.5%			-8.1% -5.1%		

Table 21B-3
Number of Years and Months Boat Ramps at Shasta Lake are Not Usable Due to Reservoir Operations

			ting Condi	itions	No Projec	t / No Acti	on Alternative		Alternative			Alternative		Alternative C		
Name of			Number		Number		Percent	Number	Number	Percent	Number	Number		Number		Percent
Boat Ramp	Elevation	of Years	of Months	of Months	of Years	of Months	of Months	of Years	of Months	of Months	of Years	of Months	of Months	of Years	of Months	of Months
Bailey Cove	1,017	65	195	19.1%	67	202	18.9%	61	182	18.1%	62	2 182	2 18.3%	61	I 168	19.5%
Antlers	992	31	99	2.4%	33	103	1.4%	27	88	1.8%	26	89	1.6%	27	7 87	1.8%
Hirz Bay	972	19	71	1.4%	18	70	0.8%	15	56	0.2%	15	5 51	0.6%	16	5 54	0.6%
Packers Bay	952	11	42		13	48		11	39		10	38	3	11	I 38	
Silverthorn Marina	942	10	35		11	41		11	37		(33	3	8	3 26	
Digger Bay Marina	937	9	30		11	37	•	8	27		3	3 29	9	7	7 22	
Sugarloaf	907	7	20		8	23	•	8	18		(5 17	7	6	5 13	
Bridge Bay Resort	882	7	18		7	16	i	5	10			5 11	I	4	1 9	
Centimudi/Jones Valley	857	5	11		5	11		4	8		ţ	5 8	3	2	2 4	
Total Months Dewatered Percent Decrease in Dewatering Compared to Existing Conditions Percent Decrease in			521			551 5.8%			465 -10.7%			458 -12.1%			421 -19.2%	
Dewatering Compared to the No Project / No Action Alternative									-15.6%			-16.9%	ó		-23.6%	

Table 21B-4
Number of Years and Months Boat Ramps at Lake Oroville are Not Usable Due to Reservoir Operations

			ting Condi				ion Alternative		Alternative			Alternative		Alternative C		
Name of		Number	Number	Percent	Number	Number	Percent	Number	Number	Percent	Number	Number	Percent	Number	Number	Percent
Boat Ramp	Elevation	of Years	of Months	of Months	of Years	of Months	of Months	of Years	of Months	of Months	of Years	of Months	of Months	of Years	of Months	of Months
Loafer Creek	775	45	5 125	25.4%	46	129	26.2%	44	123	25.0%	43	3 122	24.8%	41	119	24.2%
Enterprise	750	32	93	18.9%	34	92	18.7%	35	5 89	18.1%	34	1 90	18.3%	34	92	18.7%
Lime Saddle	702	19	51	10.4%	20	52	10.6%	18	3 47	9.6%	19	9 46	9.3%	20	48	9.8%
Spillway	695	19	47	9.6%	29	50	10.2%	17	42	8.5%	18	3 43	8.7%	19	46	9.3%
Bidwell Canyon*	675	5	5 12	2.4%	0	0	0.0%	(0	0.0%	() 0	0.0%	C	0	0.0%
Total Months Dewatered Percent Decrease in Dewatering Compared to Existing Conditions Percent Decrease in Dewatering Compared to the No Project / No Action Alternative			328			323 -1.5%			301 -8.2% -6.8%			301 -8.2% -6.8%	,		-7.0% -5.6%	
	The Bidwell Canyon low water ramp would be extended with implementation of the No Project/No Action Alternative to a bottom elevation at which it would always be in the water. Alternatives A, B, and C would not change those conditions.															

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Table 21B-5
Number of Years and Months Boat Ramps at Folsom Lake are Not Usable Due to Reservoir Operations

		Existing Conditions			No Project / No Action Alternative			Alternative A			Alternative B			Alternative C		
Name of		Number	Number		Number	Number	Percent	Number	Number	Percent	Number	Number		Number	Number	Percent
Boat Ramp	Elevation	of Years	of Months	of Months	of Years	of Months	of Months	of Years	of Months	of Months	of Years	of Months	of Months	of Years	of Months	of Months
Rattlesnake Bar/New Stage Four	425	44	143	29.1%	46	154	31.3%	38	135	27.4%	42	139	28.3%	35	130	26.4%
Five Percent/Folsom Point	408	26	76	15.4%	29	85	17.3%	24	74	15.0%	24	71	14.4%	26	75	15.2%
Folsom Lake Marina/Stage One	395	12	38	7.7%	14	45	9.1%	16	37	7.5%	12	39	7.9%	14	35	7.1%
Hobie Cove	375	4	. 13	2.6%	4	. 14	2.8%	4	11	2.2%	3	13	2.6%	5	11	2.2%
Low Water	370	4	. 13	2.6%	4	. 14	2.8%	3	10	2.0%	3	12	2.4%	3	9	1.8%
Total Months Dewatered			283			312			267			274			260)
Percent Decrease in Dewatering Compared to Existing Conditions Percent Decrease in Dewatering						10.2%			-5.7%			-3.2%	,		-8.1%	,
compared to the No Project / No Action Alternative									-14.4%			-12.2%	•		-16.7%	,

Table 21B-6

Number of Years and Months Boat Ramps at Sites Reservoir are Not Usable Due to Reservoir Operations

				Alternative	e A		Alternative	e B	Alternative C			
				NWS=480	feet		NWS=520	feet	NWS=520 feet			
Name of	Bottom		Number	Number	Percent	Number	Number	Percent	Number	Number	Percent	
Boat Ramp	Elevation		of Years	of Months	of Months	of Years	of Months	of Months	of Years	of Months	of Months	
Stone Corral		400	17	75	15.2%	16	78	15.9%	11	39	7.9%	
Unknown		420	29	113	23.0%	19	86	17.5%	13	66	13.4%	
Total Months												
Dewatered				188			164			105		
Percent												
Decrease in												
Dewatering												
Compared to												
Alternative A							-12.8%			-44.1%	1	
Percent												
Decrease in												
Dewatering												
Compared to												
Alternative B										-35.98%	1	